9/28/17

"Success is not final, failure is not fatal: it is courage to continue that counts"-Winston Churchill

HW:
"2017 A2 CC Multiplying Radicals" worksheet #3, 5, 7, 9, 13, 15, 17, 19, 23, 25
Test on Monday 10/16

AIM: How do we Multiply Radicals?

Warm Up:

1. $3\sqrt{8} + \sqrt{18}$

$\sqrt{4}\ \sqrt{2}\quad \sqrt{9}\ \sqrt{2}$

$3 \cdot 2\sqrt{2}$

$6\sqrt{2} + 3\sqrt{2}$

$\boxed{9\sqrt{2}}$

2. $a\sqrt{5a} + 3\sqrt{45a^3}$

$\sqrt{9a^2}\ \sqrt{5a^1}$

$3 \cdot 3a\sqrt{5a}$

$a\sqrt{5a} + 9a\sqrt{5a}$

$10a\sqrt{5a}$

HW: Check

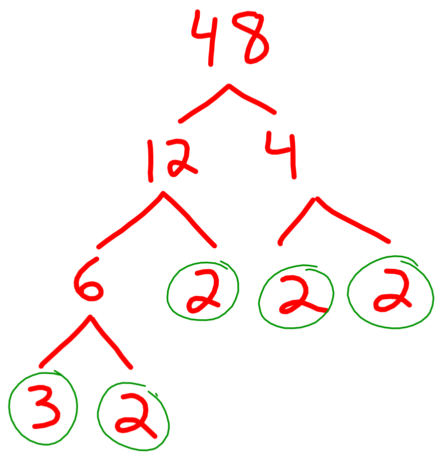
30) $\sqrt[4]{48} - \sqrt[4]{3}$

$\sqrt[4]{2^4 \cdot 3}$

$\sqrt[4]{2^4} \quad \sqrt[4]{3^1}$

$2^1 \sqrt[4]{3} - \sqrt[4]{3}$

$1\sqrt[4]{3}$



$48 = 2^4 \cdot 3$

16) $3x^3\sqrt{80} + 2\sqrt{125x^6}$

$\sqrt{16} \quad \sqrt{5} \qquad \sqrt{25x^6} \quad \sqrt{5}$

$3x^3 \, 4 \sqrt{5} \qquad 2 \cdot 5x^3 \sqrt{5}$

$12x^3\sqrt{5} + 10x^3\sqrt{5}$

$22x^3\sqrt{5}$

Recall that if a and b are non-negative numbers, $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$. Therefore, by the symmetric property of equality, we can say that $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$. Recall also that for any positive number a, $\sqrt{a} \cdot \sqrt{a} = \sqrt{a^2} = a$. We can use these rules to multiply radicals.

For example:

$$\sqrt{4} \cdot \sqrt{25} = \sqrt{100} = 10$$
$$\sqrt{2} \cdot \sqrt{2} = \sqrt{4} = 2$$
$$\sqrt{8} \cdot \sqrt{2} = (\sqrt{4} \cdot \sqrt{2}) \cdot \sqrt{2} = 2(\sqrt{2} \cdot \sqrt{2}) = 2(2) = 4$$
$$\sqrt{6a^3} \cdot \sqrt{18a} = \sqrt{108a^4} = \sqrt{36a^4} \cdot \sqrt{3} = 6a^2\sqrt{3} \quad (a \geq 0)$$

Note: $\sqrt{-2} \times \sqrt{-8} \neq \sqrt{16}$ because $\sqrt{-2}$ and $\sqrt{-8}$ are not real numbers.

The distributive property for multiplication over addition or subtraction is true for all real numbers. Therefore, we can apply it to irrational numbers that contain radicals.

For example:

$$\sqrt{3}(2 + \sqrt{3}) = \sqrt{3}(2) + \sqrt{3}(\sqrt{3}) = 2\sqrt{3} + 3$$
$$(2 + \sqrt{5})(1 + \sqrt{5}) = 2(1 + \sqrt{5}) + \sqrt{5}(1 + \sqrt{5})$$
$$= 2 + 2\sqrt{5} + \sqrt{5} + 5 = 7 + 3\sqrt{5}$$
$$(3 + \sqrt{2})(3 - \sqrt{2}) = 3(3 - \sqrt{2}) + \sqrt{2}(3 - \sqrt{2})$$
$$= 9 - 3\sqrt{2} + 3\sqrt{2} - 2 = 7$$

When we Multiply radicals:

1. Outside X Outside

2. Inside X Inside

3. Simplify (Break Out, if we can)

Express each of the following products in simplest form:

1. $\sqrt{5}\,(\sqrt{10}) = \sqrt{50}$

$\sqrt{25}\ \sqrt{2}$

$5\sqrt{2}$

2. $(3+\sqrt{6a})(1+\sqrt{2a})$

$3 + 3\sqrt{2a} + 1\sqrt{6a} + \sqrt{12a^2}$

$\sqrt{4a^2}\sqrt{3}$

$3 + 3\sqrt{2a} + \sqrt{6a} + 2a\sqrt{3}$

3. $\sqrt{2} \cdot \sqrt{8} = \sqrt{16} = \boxed{4}$

4. $\sqrt{5} \cdot \sqrt{45} = \sqrt{225} = 15$

10. $\sqrt{21} \cdot \sqrt{\frac{4}{3}} = \sqrt{\frac{84}{3}} = \sqrt{28}$

$\frac{21}{1} \cdot \frac{4}{3}$

$\sqrt{4}\ \sqrt{7}$

$2\sqrt{7}$

12. $(\sqrt{12})^2$